US006267765B1

(12) **United States Patent**
Taylor et al.

(10) **Patent No.: US 6,267,765 B1**
(45) **Date of Patent: Jul. 31, 2001**

(54) **MULTIDIRECTIONAL ADAPTABLE VERTEBRAL OSTEOSYNTSIS DEVICE WITH REDUCED SPACE REQUIREMENT**

(76) Inventors: **Jean Taylor**, 141 rue d'antibes, 06400 Cannes; **Bernard Villaret**, 20 rue de Salles, 17220 Croix-Chapeau, both of (FR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/445,176**

(22) PCT Filed: **Jun. 3, 1998**

(86) PCT No.: **PCT/FR98/01119**

§ 371 Date: **Mar. 2, 2000**

§ 102(e) Date: **Mar. 2, 2000**

(87) PCT Pub. No.: **WO98/55038**

PCT Pub. Date: **Dec. 10, 1998**

(30) **Foreign Application Priority Data**

Jun. 3, 1997 (IE) S970411

(51) **Int. Cl.**[7] **A61B 17/56**
(52) **U.S. Cl.** **606/61**; 606/69; 606/73
(58) **Field of Search** 606/61, 60, 73, 606/72, 69; 411/383, 388, 389, 397

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,304,179 * 4/1994 Wagner 606/61
5,591,166 * 1/1997 Bernhardt et al. 606/61
5,891,145 * 4/1999 Morrison et al. 606/61
5,984,924 * 11/1999 Asher et al. 606/61
6,022,350 * 2/2000 Ganem 606/61
6,123,706 * 9/2000 Lange 606/61

FOREIGN PATENT DOCUMENTS

19512709 * 10/1996 (DE) 606/61

* cited by examiner

Primary Examiner—Pedro Philogene
(74) *Attorney, Agent, or Firm*—Young & Thompson

(57) **ABSTRACT**

A vertebral osteosynthesis device includes at least two bone anchoring elements (1) in the vertebral bone structures respectively (S, L5.), a longitudinal linking member (2) between the bone anchoring elements, and connector links (3) between the bone anchoring elements and said linking members. Each bone anchoring element includes a bond fixing part (4), a head (5) to be gripped by a screwing device, a threaded shaft (7) extending the grip head, and a clamping element (8) to be screwed on said shaft to lock together the connector link, the longitudinal linking member and the corresponding bone anchoring element; the threaded shaft (7) is provided at its end with a hinge ball joint (11) in a housing (12) of the grip head (5), enabling a multidirectional adjustment of the shaft (7) and a positioning of the connector link (3) adapted to the vertebral segment configuration (S, L5, . . . Lw) receiving the bone anchoring elements.

13 Claims, 8 Drawing Sheets